College of Computer Sciences and Engineering

Information and Computer Science Department

ICS 343: Fundamentals of Computer Networks (3-3-4)

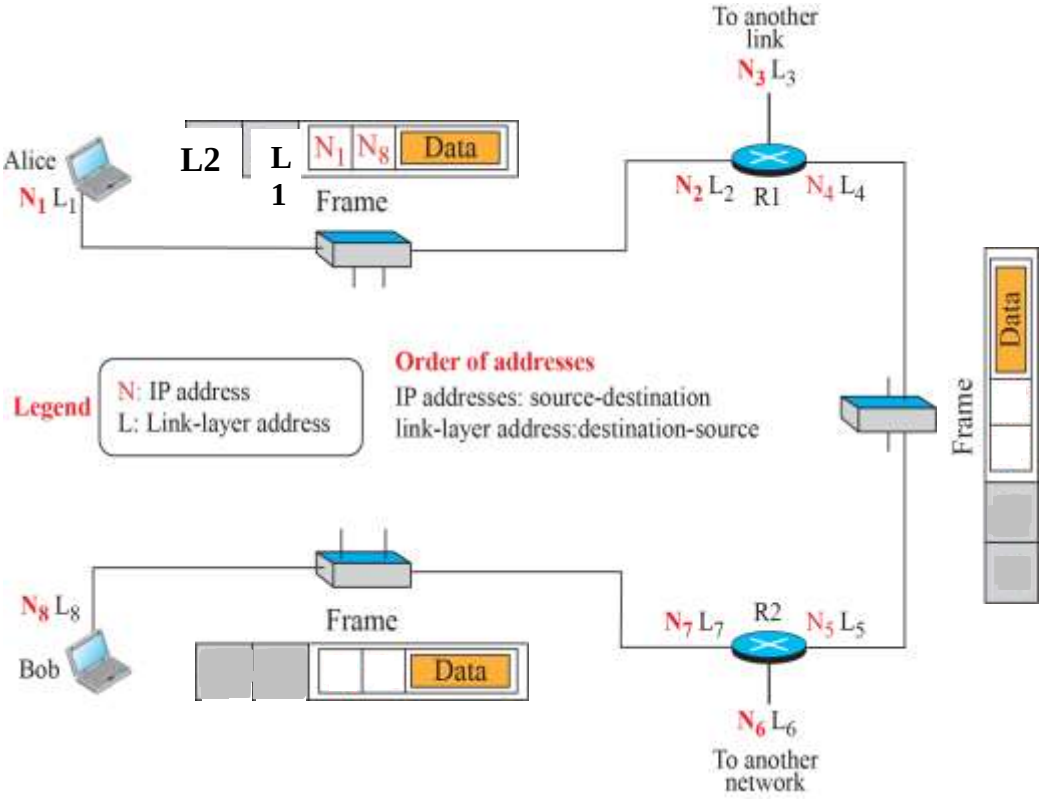
Quiz#4

Name: **ID:**

Part I (Chapter 9)

1.1. [10 points] According to the textbook, what are the two main sub-layers of the Data-Link Layer of the TCP/IP model? How do they differ?

1.2. [10 points] Based on your understanding of the relation between IP Addresses (N) and Link-Layer Addresses (L), Complete the missing 8 fields in the frames in the figure below.



Part II (Chapter 10)

2.1. [5 points] What is the minimum Hamming distance of a code that is (should be) able to detect any 3-bit errors?

2.2. [10 points]

a) What is the Hamming distance between the following two codewords?

d(1101000 , 0101011)

b) What is the maximum number of bit-errors that can be detected by these two codewords?

2.3. [5 points]Given the following Codewords, generated by Simple Parity Check:

10001, 11110, 01111, 11011 and 00110

What are their corresponding Datawords?

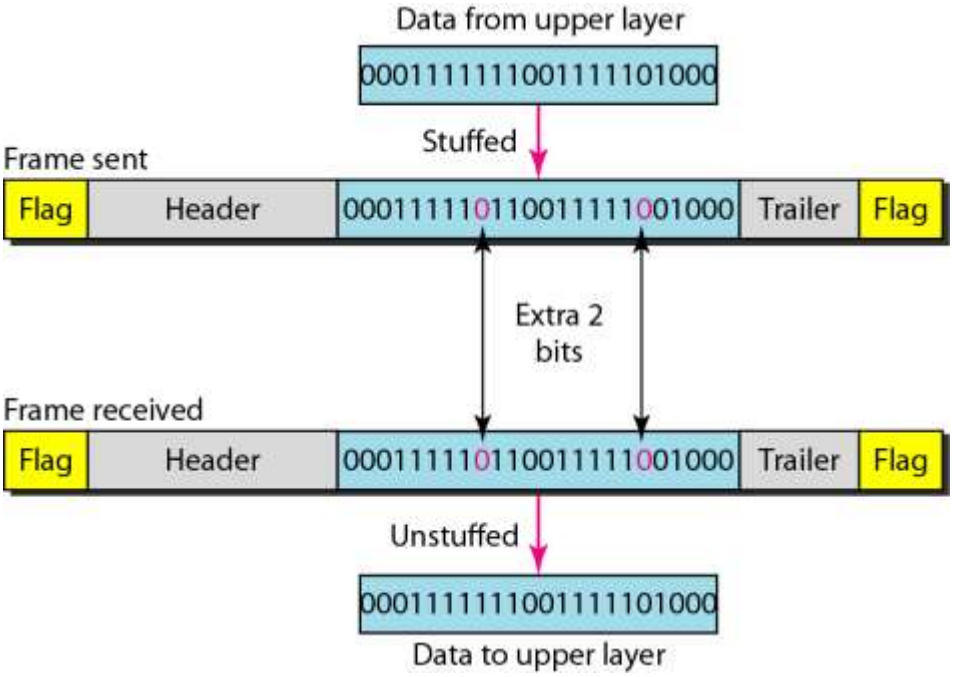
Codeword	Dataword
10001	
11110	
01111	
11011	
00110	

Part III (Chapter 11)

3.1. [15 points] Explain the need of the **ESC** character in framing (at the Data-Link Layer). Why are their **two** cases where **ESC** is being stuffed as an extra byte into a frame?

3.2. [10 points] What is Bit Stuffing? Why is it used?

Hint:



Part IV (Chapter 12)

4.1. [15 points] Compare between **Pure ALOHA**, **Slotted ALOHA** and **CSMA** in terms of their approach to reduce the chance of collision between frames.

4.2. [5 points] When can the **1-persistent** approach be considered a special case of the **p-persistent** approach?

4.3. [5 points] Explain how the concept of **Token Passing** is used to organize the access of media among stations connected to the same network.

4.4. [5 points] Check to see if the following set of chips can belong to an orthogonal system:
[+1,+1] and [+1,-1]
Explain your answer.

4.5. [5 points] Check to see if the following set of chips can belong to an orthogonal system:

[+1,+1,+1,+1] , [+1,-1,-1,+1] , [-1,+1,+1,-1] , [+1,-1,-1,+1]

Explain your answer.